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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/814,682 | 03/31/2004 | Wen Lin | LIN 13-38 | 8308 |
| 47396 | 7590 | 03/21/2006 | EXAMINER | |
| HITT GAINES, PC AGERE SYSTEMS INC. PO BOX 832570 RICHARDSON, TX 75083 | | | MALDONADO, JULIO J | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2823 | |

DATE MAILED: 03/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

EX

| | | | |
|------------------------------|---------------------------------------|-----------------------------------|--|
| Office Action Summary | Application No. 10/814,682 | Applicant(s) LIN ET AL. | |
| | Examiner Julio J. Maldonado | Art Unit 2823 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 January 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 21-27 and 37-40 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 21-27 and 37-40 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 21-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Bevk et al. (U.S. 5,500,391).

In reference to claims 21-23, 37, 38 and 40, Bevk et al. (Figs.2 and 6) teach a MOS device including a co-doped germanium buried layer (34) located over a doped substrate (10); a doped epitaxial layer (30) located over the co-doped germanium buried layer (34); and transistors located over the doped epitaxial layer (30), wherein said dopant is boron and wherein said germanium layer (34) is used to control the diffusion of said dopant (column 1, line 53 – column 4, line 30).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 24-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bevk et al. (U.S. 5,500,391) as applied to claims 21-23 above, and further in view of the following comments.

In reference to claims 24 and 25, Bevk et al. substantially teach all aspects of the invention but fail to disclose wherein a dopant concentration of the co-doped germanium buried layer ranges from about 1×10^{15} atoms/cm³ to about 1×10^{20} atoms/cm³, a dopant concentration of the doped substrate ranges from about 1×10^{14} atoms/cm³ to about 1×10^{15} atoms/cm³, and a dopant concentration of the doped epitaxial layer ranges from about 1×10^{14} atoms/cm³ to about 1×10^{15} atoms/cm³. However, the selection of the selected dope ranges is obvious because it is a matter of determining optimum process condition by routine experimentation with a limited number of species to obtain a desired dopant concentration on the substrate, germanium layer and the epitaxial layer. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the above-mentioned dopant concentration to arrive at the claimed invention.

In reference to claims 26 and 27, Bevk et al. substantially teach all aspects of the invention but fail to disclose wherein the co-doped germanium buried layer has a thickness ranging from about 1 μm to about 10 μm , and wherein the doped substrate, co-doped germanium buried layer, and the doped epitaxial layer collectively have a thickness ranging from about 2 μm to about 20 μm . Notwithstanding, it would have been an obvious matter of design choice bounded by well known manufacturing constraints and ascertainable by routine experimentation and optimization to choose these particular dimensions because applicant has not disclosed that the dimensions are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical, and it appears prima facie that the process would possess utility using another

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dimension. Indeed, it has been held that mere dimensional limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical. See, for example, *In re Rose*, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984); *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

5. Claims 37-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bevk et al. (U.S. 5,500,391) in view of Murakami (U.S. 4,819,045).

In reference to claims 21-23, 37, 38 and 40, Bevk et al. (Figs.2 and 6) teach a MOS device including a co-doped germanium buried layer (34) located over a doped substrate (10); a doped epitaxial layer (30) located over the co-doped germanium buried layer (34); and transistors located over the doped epitaxial layer (30), wherein said dopant is boron and wherein said germanium layer (34) is used to control the diffusion of said dopant (column 1, line 53 – column 4, line 30).

Bevk et al. fail to expressly teach wherein said MOS device further includes interconnects located within interlevel dielectric layers located over the transistors, which connect the transistors to form an operational integrated circuit and additional active and passive devices.

However, Murakami (Fig.3M) teaches a method of forming a MOS device including interconnects located within interlevel dielectric layers located over the transistors, which connect the transistors to form an operational integrated circuit and

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additional active and passive devices (Murakami, column 4, lines 26 - 47).

Furthermore, it is well-known in the art directed to MOS devices that these devices further include interconnects and other active and passive devices located within interlevel dielectric layers located over the transistors, which connect the transistors to form an operational integrated circuit. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made that to combine the teachings of Bevk et al. and Murakami to enable the MOS device as disclosed by Bevk et al. to further include interconnects located within interlevel dielectric layers located over the MOS devices of Bevk et al. as taught by Murakami to arrive at the claimed invention.

Response to Arguments

6. Applicant's arguments filed 01/18/2006 have been fully considered but they are not persuasive.

Applicants argue, "...Bevk does not disclose or describe a co-doped germanium buried layer. The impurity in the germanium layer in Bevk arises as a result of migration and not as a result of co-doping during the process of manufacturing...". In response to this argument, the determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. In the prior art of record, Bevk et al. teach a layer of germanium doped with boron, and that layer of germanium was labeled as a co-doped layer germanium buried layer.

Conclusion

7. Applicants are encouraged, where appropriate, to check Patent Application Information Retrieval (PAIR) (<http://portal.uspto.gov/external/portal/pair>) which provides

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applicants direct secure access to their own patent application status information, as well as to general patent information publicly available.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Julio J. Maldonado whose telephone number is (571) 272-1864. The examiner can normally be reached on Monday through Friday.

9. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith, can be reached on (571) 272-1907. The fax number for this group is 571-273-8300. Updates can be found at <http://www.uspto.gov/web/info/2800.htm>.



Julio J. Maldonado
March 15, 2006

Julio J. Maldonado
Patent Examiner
Art Unit 2823



George Fourson
Primary Examiner